REMARKS/ARGUMENTS

Applicants have carefully reviewed the Office Action dated March 16, 2007. Reconsideration of the Examiner's rejection of the claims is respectfully requested. A total of 21 claims remain in the case. Independent claim 1 has been amended to include further patentable distinctions over the cited art. Dependent claims 2-21 have been amended for consistency with the amendments made to claim 1 and/or for a proper formatting of claims according to recent established standards. That is, in the introductory phrase, the word "A" has been changed to "The". Additionally, claims 1-21 have been amended to emphasize that the non-ionic styrenic resin composition is a "non-ionic rubber modified styrenic resin composition". Claim 1 has been further amended to change "comprising" to "consisting". Claims 22-24 have been cancelled without prejudice in view of the amendments made to claim 1.

The Invention

The claimed invention, particularly claim 1 as amended, relates to a non-ionic rubber modified styrenic resin composition consisting of a rubber modified styrene maleic anhydride (SMA) copolymer and polybutene, and optionally additives. This non-ionic rubber modified styrenic resin composition of claim 1 as amended has at least two distinctions not found in the cited prior art. These include the non-ionic rubber modified styrenic resin composition: 1) being produced in a polymerization process; and 2) the polybutene being part of the reactive mixture of the styrene, the maleic anhydride and the rubber in the polymerization process.

In addition to these two distinctions, it is to be understood that none of the components of the rubber modified styrene maleic anhydride (SMA) copolymer including the anhydride, have any ionic functional groups thereby distinguishing claim 1 from that of the Kim reference. Also, the composition of claim 1 is particularly suitable for food packaging and food services, e.g., containers for use in the microwave heating of foods which use is different from those of the cited references. For example, the polymer blends of the Kim reference are used in sporting goods and golf balls. The resin composition of the Sugioka reference is used in semiconductor carrier devices.

Response to Amendment

In the Office Action, the Examiner removed the rejection of claims 1-24 under 35 U.S.C. 103(a) as being unpatentable over Kim (U.S. Patent No. 6,930,150) taken with Wang et al (U.S. Patent No. 5,852,124), based upon Applicants' amendments to the claims, i.e., the recitation of "non-ionic". However, this rejection was to be re-instated upon amendment of the claims to their original form.

The above amendments to the claims in this Amendment retain the word "non-ionic", and introduce further distinctions. Applicants' present arguments for the patentability of the claims as amended herein in view of the newly cited reference to Sugioka, et al. (U.S. Patent No. 6,348540 B1).

Applicants wish to comment that amendments to the claims were made to include the word "non-ionic" in order to differentiate the invention from the Kim reference which discloses that Component A has at least one component that has at least 5% by weight of anionic functional groups. If a

disclosure does not classify a chemical as being ionic, then by omission, it is non-ionic. Thus, Applicants feel that the specification of the instant application does, in fact, provide support for reciting that the styrenic resin composition is "non-ionic" since it does not teach that any components of the styrenic resin composition are "ionic". Additionally, a rubber modified styrene maleic anhydride copolymer by its very nature is not ionic but covalent or polar, more about which is discussed herein below.

Claim Rejections Under 35 U.S.C.§112

Claims 1-24 stand rejected under 35 U.S.C. §112, first paragraph, as failing to comply with the written description requirement. The Examiner's position is that the recitation of "non-ionic" in each of the claims has no antecedent bases in the specification as originally filed.

For the reasons stated in the preceding paragraphs and those given in the previous Amendment filed on January 16, 2007, Applicants believe that the specification does give support for including this term so as to distinguish the claimed invention over the Kim reference.

Claims 1-24 stand rejected under 35 U.S.C. §112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicants regard as the invention.

The Examiner states that the recitation of "non-ionic rubber modified styrene maleic anhydride copolymer" is an oxymoron since the presence of the maleic anhydride group produces an ionic polymer. The Examiner notes the Sugioka et al. reference at column 5, lines 15-34, and further states that the recitation is vague and confusing since it is counter to what is known in the art.

Applicants wish to point out that column 5, lines 15-34 of this reference discloses maleic anhydride in the context of a polar group, which Applicants believe to be correct. That is, maleic anhydride is polar but it is not ionic. "Polar" does not necessarily equal "ionic". According to basic chemistry, a covalent or polar bond is formed when two atoms are able to share electrons. An ionic bond is formed when the "sharing" is so unequal that an electron from one atom is completely lost to the other atom, resulting in a pair of ions. (*Chemical bonds: covalent or ionic?* Retrieved on May 18, 2007 from http://www.chem1.com/acad/webtut/bonding/polcov.html)

As stated herein above, a rubber modified styrene maleic anhydride copolymer by its very nature is not ionic but contains polar groups. There is no ionic moiety in the polymer molecule and there is no counter ion present. Also, the addition of polybutene to this copolymer would not result in an ionic resin composition, and thus, the term "non-ionic styrenic resin composition" in the claims is accurate.

The following definitions are instructive:

Ion - An atom or group of atoms that has either lost one or more electrons, making it positively charged (a cation), or gained one or more electrons, making it negatively charged (an anion).

Polar compound - A compound that is either ionic (e.g., sodium chloride) or that has molecules with a large permanent dipole moment (e.g., water).

Oxford Dictionary of Chemistry, John Daintith Edition, Oxford University Press, Oxford, 1996, pp. 263 and 390.

An anhydride is a functional derivative of a carboxylic acid and is a polar compound. Dicarboxylic acids yield anhydrides on heating by forming a ring structure and eliminating a water molecule. No acid groups remain in the molecule. "Morrison and Boyd, Organic Chemistry Third Edition, Allyn and Bacon, Boston, 1973, pp. 658-667.

Polybutene is a nonpolar hydrocarbon polymer. United States Patent No. 6,936,653 (abstract, Col. 4, line 12).

As stated herein above, polar can be ionic. All ionics are polar, but not all polars are ionic. Maleic anhydride is polar but not ionic. Even if acid groups are present, the compound is not ionic unless hydrolyzed with the presence of counter ions such as metal or ammonium ions.

Applicants respectfully request that the rejection to the claims on this basis be withdrawn.

Claim Rejection Under 35 U.S.C. §103

Claims 1-24 stand rejected under 35 U.S.C. 103(a) as being obvious in view of Sugioka et al (U.S. Patent No. 6,348,540).

The Examiner's position is that this reference teaches the production of a styrenic resin composition that comprises a non-ionic rubber modified styrene maleic anhydride copolymer with a polybutene constituent and the combination of constituents is shown at column 9, lines 47-65. In view of the various teachings of this reference, the Examiner feels that the manipulation of the constituents for maximum benefits derived therefrom would be well within the purview of a skilled artisan; that nothing unexpected is shown on the record; and that the expectation of success to arrive at the instantly claimed invention would be very high.

The Applicants believe that the claimed invention is patentable over the Sugioka reference. The Sugioka reference relates to a syndiotactic polystyrenic resin composition. As disclosed in column 1, lines 4-15, the styrenic resin composition comprises as its essential component, a styrenic polymer which consists chiefly of a syndiotactic structure and containing a fibrous filler (C) and a tabular filler (D) of which the physical morphology is defined. This composition is used to produce semiconductor carrier devices. As disclosed in column 3, lines 15-24, the styrenic resin composition comprises a resin moiety and an inorganic filler moiety. The resin moiety comprises, as the indispensable component, the component (A), and optionally contains components (B), (E), (F) and (G). The inorganic filler moiety comprises components (C) and (D).

Component (A) which as mentioned is indispensable to the styrenic resin composition of this reference is a styrenic polymer that consists chiefly of a syndiotactic structure. As taught in column 3, line 60, a preferred styrenic polymer includes polystyrene. As taught in column 4, lines 23-25, one or more of the styrenic polymers with a syndiotactic structure may be used in the invention either singly or as combined.

The component (B) is a rubber-like elastomer having affinity for component (A). This component (B) may include polybutadiene.

Component (E) is a polymer having compatibility with or affinity for component (A) and having a polar group. As disclosed in column 4, lines 58-65 component (E) is used for the purpose of improving the adhesiveness of the resin to the inorganic fillers, i.e., components (C) and (D). As disclosed in column 5, lines 15-23, component (E) can be prepared by re-acting a polymer having compatibility with or affinity for the

component (A) with a modifier. The modifier is a compound having an ethylenic double bond and a polar group in the molecule and includes maleic anhydride. As disclosed in column 5, lines 52-54, component (E) includes modified styrenic polymers such as styrene-maleic anhydride copolymer (SMA). As disclosed in column 6, lines 6-9, the polar group content of component (E) is 0.01 to 20% by weight relative to 100% by weight of component (E).

As disclosed in column 6, lines 23-37, Component (F) is a thermoplastic resin but does not include component (A). An example includes polybutene, 1,2-polybutadiene, low-density polyethylene, and several other known resins.

As disclosed in column 6, lines 38-61 Component (G) is a polyolefin and includes polybutene.

The Examiner states that the combination of constituents of the invention is shown at column 9, lines 47-65. This portion of the reference states that the resin moiety comprises four components which are Components (A), (B), (E) and (F). As stated herein above, Component (A) is a syndiotactic polystyrenic resin, for example, polystyrene; Component (B) is a rubber-like elastomer such as polybutadiene; Component (E) has an ethylenic double bond and a polar group and may be a styrene maleic anhydride; and Component (F) is a thermoplastic resin such as polybutene.

First, this resin moiety of the Sugioka reference contains four components. These components cannot be equated to the components of the non-ionic rubber modified styrenic resin composition of the claimed invention, particularly, Claim 1 as amended in that the non-ionic rubber modified styrenic resin composition of the claimed invention consists of two main components, i.e., 1) a rubber modified styrene maleic anhydride copolymer and 2) polybutene, and optionally,

the customary additives. The fact that component (B) may be rubber and component (E) may be a styrene maleic anhydride does not translate into these two components constituting a non-ionic rubber modified styrene maleic anhydride copolymer of the claimed invention since the rubber modified styrene maleic anhydride copolymer of the claimed invention is produced via a polymerization process and the polybutene is added to the styrene, the maleic anhydride and the rubber in the polymerization process in a reactor vessel. There is no teaching and it is not obvious that independent of component (A), a combination of components (B), (E), (F) and (G) would cover and predict the teaching of the claimed invention.

In contrast to the method for forming the rubber modified styrenic resin composition of the invention, the resin moiety of the Sugioka reference is produced by melting and kneading the constituent components and the additives in any of ribbon blenders, Henschel mixers, Banbury mixers, drum tumblers, single-screw extruders, double-screw extruders, cokneaders, multi-screw extruders, etc. (column 10, lines 33-41).

Secondly, the components (A)and optionally (B), (E), (F), and (G) constitute the resin moiety for the styrenic resin composition of this reference and these components must be used with two fillers of components (C) and (D) which are specially designed fillers used to produce desired properties for the moldings of the styrenic resin compositions of the Sugioka reference. In contrast to this, the composition of the claimed invention does not require specially designed fillers but optionally includes conventional type fillers.

Thirdly, none of the various combinations of component (A) with one or more components (B), (E), (F), and (G) as disclosed in column 9 of this reference can be equated to the non-ionic rubber modified styrenic resin composition of the

claimed invention, particularly, Claim 1 as amended. Again, and using the examples given above for components (A), (B), (E), (F), and (G), the first combination of components (A) and (B) may involve a syndiotactic styrenic polymer, for example, polystyrene and a rubber, for example, polybutadiene. The second combination of components (A), (B) and (E) may involve polystyrene, polybutadiene, and styrene maleic anhydride. The third combination of components (A), (B), and (F) may involve polystyrene, polybutadiene, and polybutene. And the last combination of components (A) and (G) may involve polystyrene and polybutene. The two main components of the resin of the claimed invention are: 1) a non-ionic rubber modified styrene maleic anhydride copolymer of which the styrene is not a syndiotactic styrenic polymer; and 2) polybutene.

In view of the above comments, Applicants believe that the claimed invention, particularly Claim 1, as amended is not disclosed, taught or suggested in the Sugioka reference, and respectfully requests that the rejection to the claims on this basis be withdrawn.

Summary and Conclusion

Applicants for the first time disclose and claim a non-ionic rubber modified styrenic resin composition consisting of a non-ionic rubber modified styrene maleic anhydride copolymer and polybutene, and optionally customary additives. This non-ionic rubber modified styrenic resin composition is made in a polymerization process and the polybutene is made part of the reactive mixture of said styrene, said maleic anhydride and said rubber in the polymerization process. There are no teachings in the art of introducing polybutene to modify and/or improve the properties of a rubber modified styrene maleic anhydride (SMA) copolymer.

Applicants respectfully request that a timely Notice of Allowance be issued in this case.

Respectfully submitted,

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